

## NEW RECORDS OF EPHEMEROPTERA, PLECOPTERA AND TRICHOPTERA FROM ALABAMA<sup>1</sup>

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**ABSTRACT:** Eleven mayfly, three stonefly and eight caddisfly species are newly recorded for Alabama. Additionally, nomenclatorial changes are given that resulted from recent revisions to previously available Alabama species lists.

In the intervening years since publication of the initial checklists of mayflies (Kondratieff and Harris 1986), stoneflies (Stark and Harris 1986), and caddisflies (Harris *et al.* 1991) from Alabama, additional collecting throughout the state by SCH and his graduate students and colleagues has revealed several new distribution records. This paper reports new state records in these groups with annotated notes on their occurrence and taxonomy.

### Ephemeroptera

Kondratieff and Harris (1986) reported 112 species of mayflies from Alabama. Wester and Folkerts (1987) added the tuskless burrowing mayfly *Dolania americana* Edmunds and Traver from Escambia Co. Also, numerous nomenclatorial changes have been published since the 1986 list. Specimens are deposited in the C. P. Gillette Museum of Arthropod Diversity, Colorado State University.

### New State Records

#### Siphonuridae

*Siphonurus mirus*: Eaton (Cleburne Co.). This large and beautiful species is widely distributed from Atlantic Canada to Georgia.

#### Baetidae

*Baetis flavistriga* McDunnough (Calhoun Co.). A transcontinental species, but apparently more common in mountain ranges (McCafferty and MacDonald 1994), including the Appalachians (Mori-hara and McCafferty 1979). Lenat and Penrose (1987) recorded *B. flavistriga* as a common and pollution tolerant species in North Carolina.

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### Heptageniidae

*Rhithrogena anomala* McDunnough (Talladega Co.). This species has been previously recorded from Quebec, New York and Virginia (Traver 1935, Kondratieff and Voshell 1983).

*Stenonema carlsoni* Lewis (Coosa Co.). Bednarik and McCafferty (1979) considered this species an upland form and more southerly distributed than its close relative *S. pudicum* (Hagen). *Stenonema carlsoni* was previously known from Georgia, Kentucky, South Carolina, Tennessee and Virginia. *Stenonema vicarium* (Walker) (Cherokee Co., DeKalb Co.). This mainly upper midwestern and northeastern North America species previously was known along the Appalachians to North Carolina (Bednarik and McCafferty 1979).

### Leptophlebiidae

*Paraleptophlebia mollis* (Eaton) (Cleburne Co.). Berner (1975) noted that this more northeastern North American species was listed from North Carolina by Traver (1937). The Alabama record represents a significant southern range extension.

*P. moerens* (McDunnough) (Jackson Co.). As Berner (1975) noted, this species has been rarely collected in the southeast. Nearby records are from Georgia and North Carolina.

*P. praepedita* (Eaton) (Hale Co.). This species was not included by Berner (1975) in his review of southeastern species. It is considered a northeastern and midwestern North America species (Burke 1953).

### Caenidae

The excellent revision of *Caenis* by Provonsha (1990) allows species determination of this formerly difficult genus.

*Caenis punctata* McDunnough (Henry Co.). Previously unknown from the southeast, Provonsha (1990) recorded this species from the surrounding states of Florida, North Carolina, South Carolina and Tennessee.

*Caenis maccafferti* Provonsha (Chilton Co.). This species was described from South Carolina and is known from Arkansas, Florida, Georgia, New York, Pennsylvania and Virginia.

Provonsha (1990) recorded *C. latipennis* Banks from Dallas Co. and Limestone Co. He also synonymized *C. jocose* McDunnough with *C. latipennis*. We have additional specimens from Wilcox Co. Provonsha (1990) also regarded *C. similans* McDunnough a synonym of *C. amica* Hagen.

### Baetiscidae

*Baetisca laurentina* McDunnough (Fayette Co.). Pescador and Berner (1981) previously listed this species from the surrounding states of Florida and Mississippi.

### Taxonomic changes

McCafferty and Waltz (1990) provided the following nomenclatorial changes in their review of North American Baetidae:

*Centroptilum fragile* McDunnough = *Procloeon fragile*

*C. hobbsi* Berner = *Procloeon hobbsi*

*Cloeon rubropictum* McDunnough = *Procloeon rubropictum*

*C. viridocularis* Berner = *Procloeon viridocularis*.

*Cloeon alamance* (Traver) = *Centroptilum alamance*

*Pseudocloeon bimaculatum* Berner = *Baetis bimaculatus*

*P. dubium* McDunnough = *Baetis dubius*

*P. parvulum* McDunnough = *Baetis armillatus* McCafferty and Waltz

*P. punctiventris* McDunnough = *Baetis punctiventris*

*P. carolina* Banks = *Acentrella turbida* (McDunnough) (McCafferty *et al.* 1994).

McCafferty and Bae (1990) proposed the genus *Anthopotamus* for North American species formerly placed in *Potamanthus*. Bae and McCafferty (1991) added *A. myops* from Alabama (Jackson Co.).

A total of 121 species of mayflies are now known from Alabama. In comparison with nearby states, Kondratieff and Voshell (1983) listed 138 species from Virginia, and Berner and Pescador (1988) reported 71 species from Florida. As Kondratieff and Harris (1986) indicated, the range of physiographic regions found in Alabama allows for a rich diversity of mayfly species.

## Plecoptera

Stark and Harris (1986) reported 71 stonefly species from Alabama. Since this time, published records have added two additional stonefly species. Stark and Lentz (1988) described *Neoperla harrisi* from Colbert and Lauderdale counties, and Young *et al.* (1989) reported *Ostrocerca truncata* (Claassen) from DeKalb Co. The following three new state records are reported: *Neoperla catharae* Stark and Baumann, *Acroneuria carolinensis* (Banks), and *A. frisoni* Stark and Brown. New nomenclatural changes are also included. All these changes, reported below, bring the current list of Alabama stoneflies to 76 species.

## New State Records

### Perlidae

*Acroneuria carolinensis* (Banks) (Autauga Co., DeKalb Co., Marion Co.). This large and widely distributed species is particularly common in the southern Appalachian region of Tennessee and the Carolinas. Its discovery in Alabama is not surprising.

*Acroneuria frisoni* Stark and Brown (Lauderdale Co., Limestone Co.).

This species was previously known as *A. evoluta* Klapalek (*sensu* Frison 1942), but it had not been reported from Alabama. *Acroneuria frisoni* is common in the midwestern states and into the Ozarks (Stark and Gaufin 1976), but these are the southernmost records of this species from east of the Mississippi River.

*Neoperla catharae* Stark and Baumann (Colbert Co.). This species is found primarily in the midwestern states, but occurs as far west as Oklahoma and as far east as Virginia. Stark (1990) reported this species from south central Tennessee.

## Taxonomic Changes

Four species listed by Stark and Harris (1986) are now known by different names as a result of taxonomic revisions. These include:

*Acroneuria mela* Frison = *Acroneuria evoluta* Klapalek. Stark and Brown (1991) found the holotype of *A. evoluta* to be consistent with the species known as *A. mela*. The species known as *A. evoluta* (*sensu* Frison 1942 and Stark and Gaufin 1976) was then renamed *A. frisoni*.

*Neoperla freytagi* Stark and Baumann = *Neoperla occipitalis* (Pictet). Zwick (1987) examined the

type of *N. occipitalis*, previously considered synonymous with *N. clymene* and found it to be distinct. Stark (1990) placed *N. freytagi* as a synonym.

*Perlinella fumipennis* Walsh = *Perlinella zwicki* Kondratieff, Kirchner and Stewart. Kondratieff *et al.* (1988) found *P. fumipennis* to be a synonym of *P. ephyre* and proposed *P. zwicki* as a new name for the distinctive southeastern species regarded as *P. fumipennis* by Zwick (1971).

*Hansonoperla appalachia* Nelson = *Hansonoperla cheaha* Kondratieff and Kirchner. Kondratieff and Kirchner (1996) revised *Hansonoperla* and proposed the name *H. cheaha* for the distinctive species known from Cleburne Co.

## Trichoptera

Harris *et al.* (1991) reported 342 species of caddisflies from Alabama, including notes on distribution within the state. Eight new state records follow with notes on their range throughout North America. Specimens are deposited at the Department of Biology, Clarion University.

### Hydroptilidae

*Hydroptila jackmanni* Blickle (Lauderdale Co.). This species is primarily north central in distribution, with Virginia representing its previous southernmost limit (Parker and Voshell 1981). This record from northern Alabama extends the southern range of this species considerably.

*Oxyethira aculea* Ross (Tuscaloosa Co.). A southwestern species recorded from Arizona, New Mexico, Oklahoma and Texas; its occurrence in Alabama is a significant range extension. A single male was collected in March from a small, springfed stream.

*Oxyethira parce* (Edwards and Arnold) (Bibb Co.). Another southwestern species previously recorded from Texas south to Chile. One specimen was collected from a small stream in central Alabama; a significant eastern range extension.

### Lepidostomatidae

*Lepidostoma compressum* Etnier and Way (DeKalb Co.). Previously recorded from Tennessee, the occurrence of this species in northern Alabama is not unexpected.

*Lepidostoma ontario* Ross (Cleburne Co.). A widespread eastern species; this record from northern Alabama represents its southernmost range extension.

### Limnephilidae

*Pycnopsyche guttifer* (Walker) (Jackson Co.). A widespread species in central and eastern North America, including the southeastern United States. Its occurrence in northern Alabama is not surprising, with records from Tennessee, Georgia, and Florida.

### Polycentropodidae

*Polycentropus interruptus* (Banks) (Tuscaloosa Co.). Similar to the preceding species in distribution. In the southeast there are records from Tennessee and Florida, so its occurrence in Alabama is not unexpected.

### Rhyacophilidae

*Rhyacophila formosa* Banks (Bibb Co.). In Harris *et al.* (1991), the presence of this species in Alabama was listed as tentative, based on larvae collected by D. Etnier. The record of this widespread eastern species is now confirmed with the collection of seven males from the same larval locality.

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## LITERATURE CITED

- Bae, Y. J. and W. P. McCafferty.** 1991. Phylogenetic systematics of the Potamanthidae (Ephemeroptera). *Trans. Amer. Entomol. Soc.* 117: 1-143.
- Bednarik, A. F. and W. P. McCafferty.** 1979. Biosystematic revision of the genus *Stenonema* (Ephemeroptera: Heptageniidae). *Can. Bull. Fish. Aquat. Sci.* 201: 1-73.
- Berner, L.** 1975. The mayfly family Leptophlebiidae in the southeastern United States. *Florida Entomol.* 58: 137-156.
- Berner, L. and M. L. Pescador.** 1988. The mayflies of Florida. Univ. Presses of Florida. Gainesville, 415 pp.
- Burks, B. D.** 1953. The mayflies, or Ephemeroptera of Illinois. *Bull. Ill. Nat. Hist. Surv.* 26: 1-216.
- Frison, T. H.** 1942. Studies of North American Plecoptera, with special reference to the fauna of Illinois. *Bull. Ill. Nat. Hist. Surv.* 22: 235-355.
- Harris, S. C., P. E. O'Neil and P. K. Lago.** 1991. Caddisflies of Alabama. *Geol. Surv. Alabama, Bull.* 142: 1-422.
- Kondratieff, B. C. and J. R. Voshell.** 1983. A checklist of the mayflies (Ephemeroptera) of Virginia, with a review of pertinent taxonomic literature. *J. Georgia Entomol. Soc.* 18: 273-279.
- Kondratieff, B. C. and S. C. Harris.** 1986. Preliminary checklist of the mayflies (Ephemeroptera) of Alabama. *Entomol. News* 97: 230-236.
- Kondratieff, B. C., R. F. Kirchner and K. W. Stewart** 1988. A review of *Perlinella* Banks (Plecoptera:Perlidae). *Ann. Entomol. Soc. Am.* 81:19-27.
- Kondratieff, B. C. and R. F. Kirchner.** 1996. Two new species of *Hansonoperla* (Plecoptera: Perlidae) from eastern North America. *Ann. Entomol. Soc. Am.* (in press).
- Lenat, D. R. and D. L. Penrose.** 1987. New distributional records for North Carolina macroinvertebrates. *Entomol. News.* 98: 67-73.
- McCafferty, W. P. and R. D. Waltz.** 1990. Revisionary synopsis of the Baetidae (Ephemeroptera) of North and Middle America. *Trans. Amer. Entomol. Soc.* 116: 769-799.
- McCafferty, W. P. and Y. J. Bae.** 1990. *Anthopotamus*, a new genus for North American species previously known as *Potamanthus* (Ephemeroptera: Potamanthidae). *Entomol. News.* 101: 200-202.
- McCafferty, W. P. and J. F. MacDonald.** 1994. New records of Ephemeroptera in Utah, with notes on biogeography. *Entomol. News:* 105: 217-221.
- McCafferty, W. P., M. J. Wigle, and R. D. Waltz.** 1994. Systematics and biology of *Acentrella turbida* (McDunnough) (Ephemeroptera; Baetidae). *Pan-Pacific Entomol.* 70: 301-308.
- Morihara, D. K. and W. P. McCafferty.** 1979. The *Baetis* larvae of North America (Ephemeroptera: Baetidae). *Trans. Amer. Entomol. Soc.* 105: 139-221.
- Parker, C. R. and J. R. Voshell, Jr.** 1981. A preliminary checklist of the caddisflies (Trichoptera) of Virginia. *J. Georgia Entomol. Soc.* 16:1-7.
- Pescador, M. L. and L. Berner.** 1981. The mayfly family Baetiscidae (Ephemeroptera). Part II Biosystematics of the genus *Baetisca*. *Trans. Amer. Entomol. Soc.* 107: 163-228.
- Provonsha, A. V.** 1991. A revision of the genus *Caenis* in North America (Ephemeroptera: Caenidae). *Trans. Amer. Entomol. Soc.* 116: 801-884.
- Stark, B. P.** 1990. *Neoperla clymene* revisited: Systematics of the Nearctic species complexes (Plecoptera:Perlidae) pp. 299-310 in I. C. Campbell (ed.) *Mayflies and Stoneflies*. Klumer Academic Publishers, Boston, Mass.

- Stark, B. P. and A. R. Gaufin.** 1976. The Nearctic species of *Acroneuria* (Plecoptera:Perlidae). J. Kansas Entomol. Soc. 49: 221-253.
- Stark, B. P. and S. C. Harris.** 1986. Records of stoneflies (Plecoptera) in Alabama. Entomol. News 97:177-182.
- Stark, B. P. and D. L. Lentz.** 1988. New species of Nearctic *Neoperla* (Plecoptera:Perlidae). Ann. Entomol. Soc. Am. 81:371-376.
- Stark, B. P. and L. D. Brown.** 1991. What is *Acroneuria evoluta* Klapalek (Plecoptera:Perlidae)? Aquat. Insects 13:29-32.
- Traver, J. R.** 1935. Part II, Systematic. Pp. 239-739. In: The biology of mayflies with a systematic account of North American species. J. G. Needham, J. R. Traver and Y. C. Hsu (eds). Comstock Publ. Co., Ithaca, New York.
- Traver, J. R.** 1937. Notes on mayflies of the southeastern states (Ephemeroptera). J. Elisha Mitchell Sci. Soc. 53: 27-86.
- Wester, E. E. and G. W. Folkerts.** 1987. The mayfly, *Dolania americana* (Ephemeroptera: Behningiidae) in Alabama. Entomol. News 98: 253-254.
- Young, D. C., B. C. Kondratieff and R. F. Kirchner.** 1989. Description of male *Ostrocerca* Ricker (Plecoptera: Nemouridae) using the scanning electron microscope. Proc. Entomol. Soc. Wash. 91:257-268.
- Zwick, P.** 1971. Notes on the genus *Perlinella* and a generic synonymy in North American Perlidae (Plecoptera). Fla. Entomol. 54:315-320.
- Zwick, P.** 1987. Notes on Plecoptera (14). *Neoperla occipitalis* (Pictet, 1841). Aquat. Insects 9:16.